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Beauregard Parish, Louisiana

National Eutrophication Survey, Las Vegas, Nev

Prepared for

Environmental Monitoring and Support Lab, Las Vegas, Nev

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NATIONAL EUTROPHICATION SURVEY

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Report

on

BUNDICK LAKE

BEAUREGARD PARISH

LOUISIANA

EPA REGION VI

Working Paper No. 533

With the cooperation of the

Louisiana Wild Life and Fisheries Commission

and the

Louisiana National Guard

March, 1977

TECHNICAL REPORT DATA

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16. ABSTRACT

Annual total phosphorus and total nitrogen loadings to the lake were estimated and subdivided according to either point or non-point source origin. An assessment of the lake's trophic condition and limiting nutrient is also provided. All data collected by the U.S.E.P.A. National Eutrophication Survey during the one year study of the lake and its tributaries are included in the report.

17. KEY WORDS AND DOCUMENT ANALYSIS

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REPORT ON BUNDICK LAKE

BEAUREGARD PARISH, LOUISIANA

EPA REGION VI

by

National Eutrophication Survey

Water and Land Quality Branch
Monitoring Operations Division
Environmental Monitoring & Support Laboratory
Las Vegas, Nevada

and

Special Studies Branch
Corvallis Environmental Research Laboratory
Corvallis, Oregon

Working Paper No. 533

OFFICE OF RESEARCH AND DEVELOPMENT
U.S. ENVIRONMENTAL PROTECTION AGENCY

March 1977

CONTENTS

	Page
Foreword	ii
List of Louisiana Study Lakes	iv
Lake and Drainage Area Map	v
Sections	
I. Conclusions	1
II. Lake and Drainage Basin Characteristics	4
III. Lake Water Quality Summary	6
IV. Nutrient Loadings	12
V. Literature Reviewed	18
VI. Appendices	19

FOREWORD

The National Eutrophication Survey was initiated in 1972 in response to an Administration commitment to investigate the nationwide threat of accelerated eutrophication to freshwater lakes and reservoirs.

OBJECTIVES

The Survey was designed to develop, in conjunction with state environmental agencies, information on nutrient sources, concentrations, and impact on selected freshwater lakes as a basis for formulating comprehensive and coordinated national, regional, and state management practices relating to point source discharge reduction and nonpoint source pollution abatement in lake watersheds.

ANALYTIC APPROACH

The mathematical and statistical procedures selected for the Survey's eutrophication analysis are based on related concepts that:

a. A generalized representation or model relating sources, concentrations, and impacts can be constructed.

b. By applying measurements of relevant parameters associated with lake degradation, the generalized model can be transformed into an operational representation of a lake, its drainage basin, and related nutrients.

c. With such a transformation, an assessment of the potential for eutrophication control can be made.

LAKE ANALYSIS

In this report, the first stage of evaluation of lake and watershed data collected from the study lake and its drainage basin is documented. The report is formatted to provide state environmental agencies with specific information for basin planning [§303(e)], water quality criteria/standards review [§303(c)], clean lakes [§314(a,b)], and water quality monitoring [§106 and §305(b)] activities mandated by the Federal Water Pollution Control Act Amendments of 1972.

Beyond the single lake analysis, broader based correlations between nutrient concentrations (and loading) and trophic condition are being made to advance the rationale and data base for refinement of nutrient water quality criteria for the Nation's freshwater lakes. Likewise, multivariate evaluations for the relationships between land use, nutrient export, and trophic condition, by lake class or use, are being developed to assist in the formulation of planning guidelines and policies by the U.S. Environmental Protection Agency and to augment plans implementation by the states.

ACKNOWLEDGMENTS

The staff of the National Eutrophication Survey (Office of Research and Development, U.S. Environmental Protection Agency) expresses sincere appreciation to the Louisiana Wild Life and Fisheries Commission, Division of Water Pollution Control for professional involvement, to the Louisiana National Guard for conducting the tributary sampling phase of the Survey, and to those Louisiana wastewater treatment plant operators who provided effluent samples and flow data.

Robert A. Lafleur, Chief; J. Dale Givens, Assistant Chief; Lewis R. Stitt, Biologist; Louis Johnson, Biologist; Lee Caubarreaux, Biologist; Darrell Reed, Engineer; Dempsey Alford, Biologist; and Elwood Goodwin, Water Quality Control Technician, all of the Louisiana Wild Life and Fisheries Commission, Division of Water Pollution Control reviewed the preliminary reports and provided critiques most useful in the preparation of this Working Paper Series.

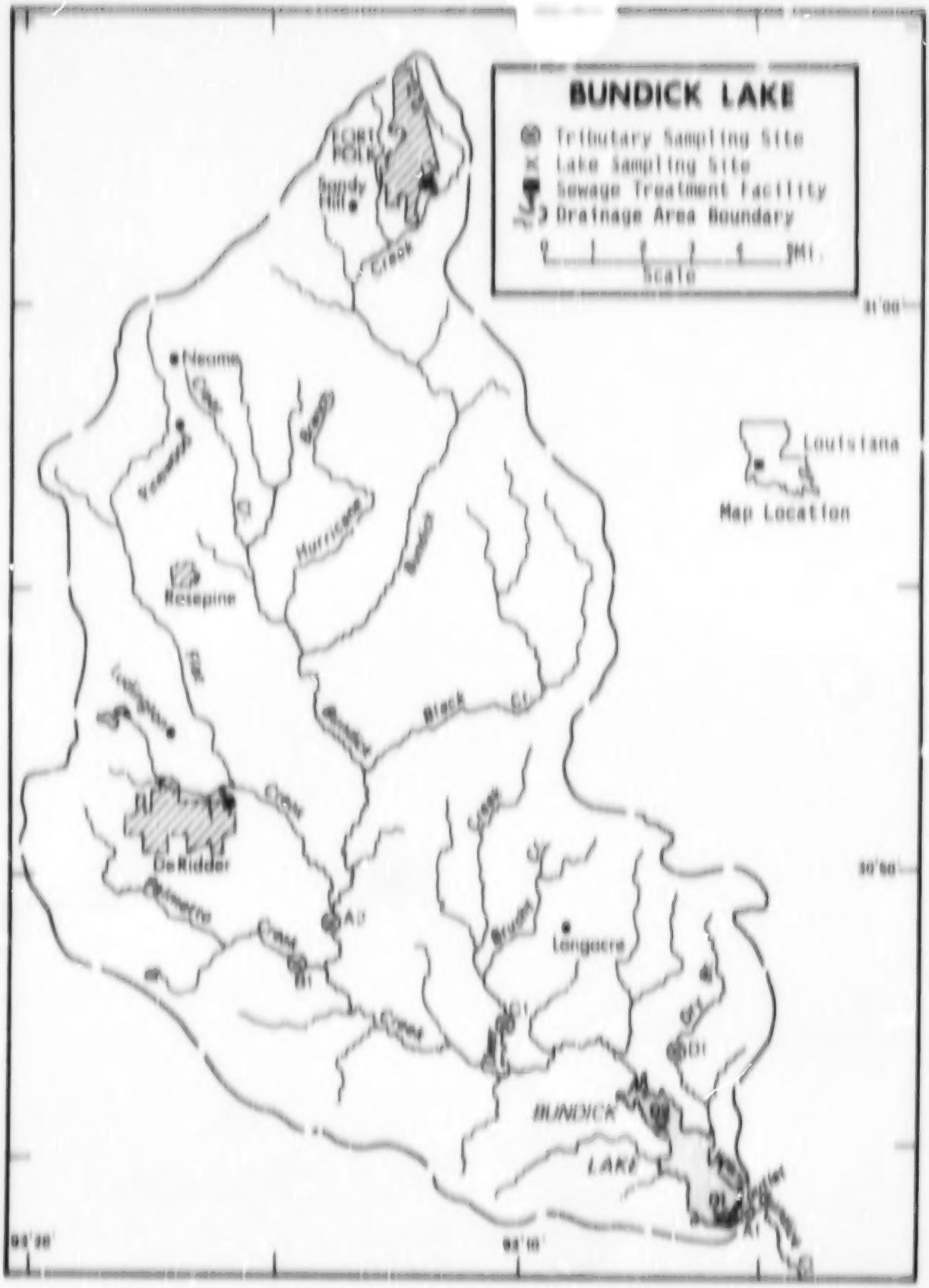
Major General O'Neil Daigle, Jr., the Adjutant General of Louisiana, and Project Officer Colonel Lawrence P. Dwyre, who directed the volunteer efforts of the Louisiana National Guardsmen, are also gratefully acknowledged for their assistance to the Survey.

NATIONAL EUTROPHICATION SURVEY

STUDY LAKES

STATE OF LOUISIANA

LAKE NAME	PARISH
Anacoco Lake	Vernon
Lake Bistineau	Bienville, Webster
Black Bayou	Caddo
Black Lake	Natchitoches and Red River
Bruin Lake	Tensas
Bundick Lake	Beauregard
Caddo Lake	Caddo (Menon and Harrison in Texas)
Cocodrie Lake	Concordia
Cocodrie Lake (Lower)	Rapides
Concordia Lake	Concordia
Cottle Lake	Rapides
Cross Lake	Caddo
D'Arbonne Lake	Union
False River Lake	Pointe Coupee
Indian Creek Reservoir	Rapides
Saline Lake	LaSalle
Turkey Creek Lake	Franklin
Lake Vernon	Vernon
Lake Verret	Assumption


BUNDICK LAKE
Tributary Sampling Site
Lake Sampling Site
Sewage Treatment Facility
Drainage Area Boundary
0 1 2 3 4 5Mi.
Scale
Louisiana
Map Location
FORT POLK
Sandy Hill
Leesville
Hurricane
Creek
Bundick
Lake
Longville
DeRidder
Longpine
31°00'
30°50'
93°20'
93°10'

REPORT ON BUNDICK LAKE, LOUISIANA
STORET NO. 2205

I. CONCLUSIONS

A. Trophic Condition:*

Survey data indicate that Bundick Lake is eutrophic, i.e., nutrient rich and highly productive. Whether such nutrient enrichment is to be considered beneficial or deleterious is determined by its actual or potential impact upon designated beneficial water uses of each lake.

Of the 19 Louisiana lakes sampled in 1974, only 2 had higher median total phosphorus, 3 had higher median inorganic nitrogen, and none had higher median orthophosphorus levels than Bundick Lake. Low Secchi disc visibility and high potential for primary productivity as measured by algal assay control yields were noted. Chlorophyll a values ranged from 6.1 ug/l in the fall to 38.5 ug/l in the summer, with a mean of 20.5 ug/l.

Field limnologists reported patches of floating macrophytes and some mats of phytoplankton along the shoreline areas of the lake during summer and autumn sampling.

*See Appendix E.

B. Rate-Limiting Nutrient:

Algal assay results indicate that Bundick Lake was limited by available nitrogen. Spikes with nitrogen alone, or nitrogen and phosphorus simultaneously resulted in increases in assay yield. Addition of phosphorus alone did not stimulate a growth response. The ratio of available nitrogen to orthophosphorus (N/P) in sampled waters substantiate nitrogen limitation.

C. Nutrient Controllability:

1. Point sources -

Point sources contributed 27.0% of the total phosphorus loading reaching Bundick Lake. South Fort Polk contributed 16.8% and the city of De Ridder contributed 10.2%. The present loading of 7.50 g/m^2/yr is six times that proposed by Vollenweider (1975) as "eutrophic" for a lake of such volume and retention time. However, Vollenweider's model may not apply to water bodies with short hydraulic retention times and the hydraulic retention time of Bundick Lake is only 15 days.

2. Nonpoint sources -

The mean annual phosphorus load from measured tributaries amounted to 61.5% of the load to Bundick Lake. Bundick Creek contributed 46.1% while ungaged tributaries contributed 11.3% of the load. However, loading calculations for Bundick Lake

yield a net export of nitrogen indicating sampling was not adequate to accurately depict actual nitrogen loading and export rates.

In general, few lakes are nitrogen limited as a result of low nitrogen. Rather, excessive phosphorus levels shift limitations to nitrogen or other factors. Regardless of the primary nutrient limitation suggested by either algal assay or nutrient ratios, the most feasible approach to nutrient control, if desirable, is through available phosphorus control technology and subsequent establishment of phosphorus limitation within the water body.

II. LAKE AND DRAINAGE BASIN CHARACTERISTICS

Lake and drainage basin characteristics are itemized below. Lake surface area and mean depth were provided by the State of Louisiana. Maximum depth was obtained from maps provided by the Louisiana Stream Control Commission. Tributary flow data were provided by the Louisiana District Office of the U.S. Geological Survey (USGS). Mean hydraulic retention time was obtained by dividing the lake volume by the mean flow of the outlet. Precipitation values are estimated by methods as outlined in National Eutrophication Survey (NES) Working Paper No. 175. A table of metric/English conversions is included as Appendix A.

A. Lake Morphometry:

1. Surface area: 7.07 km^2.
2. Mean depth: 1.6 meters.
3. Maximum depth: 7.6 meters.
4. Volume: 11,348 x 106 m^3.
5. Mean hydraulic retention time: 15 days.

B. Tributary and Outlet.
(See Appendix B for flow data)

1. Tributaries -

Name	Drainage area (km^2)	Mean flow ($m^3/sec.$)
A-2 Rundick Creek	310.8	4.15
B-1 Palmetto Creek	45.6	0.61
C-1 Deer Creek	44.5	0.59
D-1 Dry Creek	11.3	0.15
Minor tributaries and immediate drainage -	127.6	1.80
Totals	539.8	7.30
2. Outlet - A-1 Rundick Creek	546.5	8.90

C. Precipitation:

1. Year of sampling: 180.0 cm.
2. Mean annual: 150.0 cm.

III. LAKE WATER QUALITY SUMMARY

Bundick Lake was sampled three times during the open-water season of 1974 by means of a pontoon-equipped Huey helicopter. Each time, samples for physical and chemical parameters were collected from two stations on the lake and from one or more depths at each station (see map, page v). During each visit, depth-integrated samples were collected from each station for chlorophyll a analysis and phytoplankton identification and enumeration. During the first and last, 18.9-liter depth-integrated samples were composited for algal assays. Maximum depths sampled were 1.5 meters at Station 01 and 0.6 meters at Station 02. For a more detailed explanation of NES methods, see NES Working Paper No. 175.

The results obtained are presented in full in Appendix C and are summarized in III-A for waters at the surface and at the maximum depth for each site. Results of the phytoplankton counts and chlorophyll a determinations are included in III-B. Results of the limiting nutrient study are presented in III-C.

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B. Biological Characteristics:

1. Phytoplankton

Sampling Date	Dominant Genera	Algal Units per ml
03/20/74	1. Melosira	8,775
	2. Cryptomonas	1,051
	3. Trachelomonas	626
	4. Aphanocapsa	283
	5. Crucigenia	263
	Other genera	1,982
	Total	12,980
05/30/74	1. Melosira	3,719
	2. Kirchneriella	1,438
	3. Chlamydomonas	967
	4. Cryptomonas	694
	5. Microcystis	645
	Other genera	4,810
	Total	12,173
11/12/74	1. Dactylococcopsis	533
	2. Melosira	374
	3. Cyclotella	373
	4. Scenedesmus	373
	5. Kirchneriella	320
	Other genera	959
	Total	2,932

2. Chlorophyll a -

Sampling Date	Station Number	Chlorophyll a (µg/l)
03/20/74	01	14.1
	02	21.1
05/30/74	01	28.9
	02	38.6
11/12/74	01	6.1
	02	16.1

C. Limiting Nutrient Study:

1. Autoclaved, filtered, and nutrient spiked -

a. 03/20/74

Spike(mg/l)	Ortho P Conc.(mg/l)	Inorganic N Conc.(mg/l)	Maximum yield (mg/l-dry wt.)
Control	0.005	0.335	2.3
0.05 P	0.135	0.335	2.7
0.05 P + 1.0 N	0.135	1.335	23.0
1.00 N	0.005	1.335	17.5

b. 11/12/74

Spike(mg/l)	Ortho P Conc.(mg/l)	Inorganic N Conc.(mg/l)	Maximum yield (mg/l-dry wt.)
Control	0.141	0.191	0.0
0.05 P	0.191	0.191	7.4
0.05 P + 1.0 N	0.191	1.191	28.3
1.00 N	0.141	1.191	28.3

2. Discussion -

The control yields of the assay alga, Selenastrum capricornutum, indicate that the potential for primary productivity in Rundick Lake was high during the spring and fall samplings. The substantial increases in yield in each assay with the addition of nitrogen, and the lack of response to the addition of phosphorus indicate nitrogen limitation. In the spring assay, the simultaneous addition of nitrogen and phosphorus spikes resulted in maximum yield.

The N/P ratio in the field was 5/1 in the spring, 1/1 in the summer, and 2/1 in the fall, suggesting that the lake was nitrogen limited at those times (an N/P ratio of 14/1 or greater generally reflects phosphorus limitation).

It should be noted that significant chemical changes took place in Louisiana lake samples between the time of sample collection and assay analysis. The assay data should be considered in this context and until such differences are resolved, used with caution for any predictions of actual lake conditions. Such chemical changes are likely to alter the assay control yield as well as modifying the N/P ratio.

IV. NUTRIENT LOADINGS
(See Appendix D for data)

For the determination of nutrient loadings, the Louisiana National Guard collected monthly near-surface grab samples from each of the tributary sites indicated on the map (page 9), except for the high runoff months of February, March, and April when two samples were collected. Sampling was begun in June 1974, and was completed in May 1975.

Through an interagency agreement, stream flow estimates for the year of sampling and a "normalized" or average year were provided by the Louisiana District Office of the USGS for the tributary sites nearest the lake.

In this report, nutrient loads for sampled tributaries, except Dry Creek, Station D-1, were determined by using a modification of the USGS computer program for calculating stream loadings. Nutrient loads indicated for tributaries are those measured minus known point source loads, if any.

Nutrient loadings for Dry Creek, Station D-1, and unsampled "minor tributaries and immediate drainage" ("ZZ" of USGS) were estimated by using the mean annual nutrient loads, in $kg/km^2/yr$, in Deer Creek at Station C-1, and multiplying the means by the appropriate area in km^2.

The operators of the North and South Fort Polk and De Ridder wastewater treatment plants provided monthly effluent samples and corresponding flow data.

A. Waste Sources:

1. Known municipal -

Name	Population Served[a]	Treatment[a]	Mean Flow ($m^3/d \times 10^3$)	Receiving Water[a]
South Fort Polk	10,110	Trickling Filter	5.284	Bundick Creek
De Ridder	8,800	Trickling Filter	3.785	Hickory Creek/ Flat Creek

2. Known industrial - None

[a]Sewage treatment plant questionnaires.

B. Annual Total Phosphorus Loading - Average Year:

1. Inputs -

Source	kg P/yr	% of total
a. Tributaries (nonpoint load) -		
A-2 Bundick Creek	24,440	46.1
B-1 Palmetto Creek	5,570	10.5
C-1 Deer Creek	2,005	3.8
D-1 Dry Creek	530	1.0
b. Minor tributaries and immediate drainage (nonpoint load) -	5,995	11.3
c Known municipal STP's -		
South Fort Polk	8,920	16.8
De Ridder	5,355	10.2
d. Septic tanks* -	60	0.1
e. Known industrial - None		
f. Direct precipitation** -	125	0.2
Totals	53,020	100.0
2. Output - A-1 Bundick Creek	31,130	
3. Net annual P accumulation -	21,890	

*Estimate based on two lakeside dwellings.
**Estimated (see NES Working Paper No. 175).

C. Annual Total Nitrogen Loading - Average Year:

1. Inputs -

Source	kg N/yr	% of total
a. Tributaries (nonpoint load) -		
A-2 Bundick Creek	121,065	48.4
B-1 Palmetto Creek	24,495	9.7
C-1 Deer Creek	14,480	5.7
D-1 Dry Creek	3,670	1.5
b. Minor tributaries and immediate drainage (nonpoint load) -	41,470	16.5
c. Known municipal STP's -		
South Fort Polk	23,595	9.4
De Ridder	14,725	5.8
d. Septic tanks* -	20	<0.1
e. Known industrial - None		
f. Direct precipitation** -	7,635	3.0
Totals	251,955	100.0
2. Output - A-1 Bundick Creek	264,075	
3. Net annual N export*** -	12,120	

*Estimate based on two lakeside dwellings.
**Estimated (see NES Working Paper No. 175).
***Export probably due to unknown sources and/or sampling error.

D. Mean Annual Nonpoint Nutrient Export by Subdrainage Area:

Tributary	kg P/km²/yr	kg N/km²/yr
Bundick Creek	79	392
Palmetto Creek*	122	537
Deer Creek	92	325
Dry Creek	47	325

*Background levels for this tributary probably inflated by unknown point sources upstream.

f. Yearly Loadings:

In the following table, the existing phosphorus annual loading is compared to the relationship proposed by Vollenweider (1975). Essentially, his "eutrophic" loading is that at which the receiving waters would become eutrophic or remain eutrophic; his "oligotrophic" loading is that which would result in the receiving water remaining oligotrophic or becoming oligotrophic if morphometry permitted. A "mesotrophic" loading would be considered one between "eutrophic" and "oligotrophic".

Note that Vollenweider's model may not apply to lakes with short hydraulic retention times or in which light penetration is severely restricted by high concentrations of suspended solids in the surface waters.

	Total Yearly Phosphorus Loading ($g/m^2/yr$)
Estimated loading for Bundick Lake	7.50
Vollenweider's "eutrophic" loading	1.22
Vollenweider's "oligotrophic" loading	0.61

V. LITERATURE REVIEWED

U.S. Environmental Protection Agency. 1975. National Eutrophication Survey Methods 1973-1976. Working Paper No. 175. National Environmental Research Center, Las Vegas, Nevada, and Pacific Northwest Environmental Research Laboratory, Corvallis, Oregon.

Vollenweider, R. A. 1975. Input-Output Models With Special Reference to the Phosphorus Loading Concept in Limnology. Schweiz. Z. Hydrol. 37:53-84.

VI. APPENDICES

APPENDIX A
CONVERSION FACTORS

CONVERSION FACTORS

Hectares x 2.471 = acres

Kilometers x 0.6214 = miles

Meters x 3.281 = feet

Cubic meters x 8.107×10^{-4} = acre/feet

Square kilometers x 0.3861 = square miles

Cubic meters/sec x 35.315 = cubic feet/sec

Centimeters x 0.3937 = inches

Kilograms x 2.205 = pounds

Kilograms/square kilometer x 5.711 = lbs/square mile

APPENDIX B

TRIBUTARY FLOW DATA

[illegible]

LAKE CODE [illegible] [illegible] LAKE

TOTAL DRAINAGE AREA OF LAKE (SQ MI) = [illegible]

[illegible]	SUBDRAINAGE [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	SPECIFIED FLOWS(CFS) [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]

TOTAL DRAINAGE AREA OF LAKE = [illegible] TOTAL FLOW IN = [illegible]
SUM OF SUBDRAINAGE AREAS = [illegible] TOTAL FLOW OUT = [illegible]

[illegible] MONTHLY FLOWS AND ANNUAL FLOWS(CFS)

[illegible]	[illegible]	[illegible]	[illegible] FLOW	[illegible]	FLOW	[illegible]	[illegible]	[illegible]	FLOW
[illegible]	6	74	[illegible]	6	[illegible]				
	7	74	[illegible]	7	[illegible]				
	8	74	[illegible]	27	[illegible]				
	9	74	[illegible]	4	[illegible]				
	10	74	[illegible]	28	[illegible]				
	11	74	[illegible]	12	[illegible]				
	12	74	[illegible]	7	[illegible]				
	1	75	[illegible]	13	[illegible]				
	2	75	[illegible]	6	[illegible]	23	[illegible]		
	3	75	[illegible]	4	[illegible]	24	[illegible]		
	4	75	[illegible]	7	[illegible]	23	[illegible]		
	5	75	[illegible]	2	[illegible]				
[illegible]	6	74	[illegible]	4	[illegible]				
	7	74	[illegible]	7	[illegible]				
	8	74	[illegible]	18	[illegible]				
	9	74	[illegible]	8	[illegible]				
	10	74	[illegible]	18	[illegible]				
	11	74	[illegible]	17	[illegible]				
	12	74	[illegible]	7	[illegible]				
	1	75	[illegible]	13	[illegible]				
	2	75	[illegible]	4	[illegible]	23	[illegible]		
	3	75	[illegible]	6	[illegible]	24	[illegible]		
	4	75	[illegible]	7	[illegible]	23	[illegible]		
	5	75	[illegible]	2	[illegible]				

APPENDIX C

PHYSICAL AND CHEMICAL DATA

[illegible]

APPENDIX D

TRIBUTARY AND WASTEWATER TREATMENT PLANT DATA

[illegible]

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APPENDIX I

PARAMETRIC RANKINGS OF LAKES SAMPLED BY NES IN 1974

STATE OF LOUISIANA

LAKE DATA TO BE USED IN [illegible]

LAKE CODE	LAKE NAME	[illegible] TOTAL P	[illegible] INLET P	[illegible] [illegible] SEC	[illegible] CHLOR	[illegible] SD	[illegible] [illegible] [illegible] P
[illegible]	[illegible] LAKE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] LAKE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	[illegible] LAKE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] LAKE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] LAKE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] [illegible] LAKE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] LAKE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] [illegible] LAKE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	LAKE [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	LAKE [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] LAKE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] LAKE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible] OF LAKES WITH [illegible] VALUES (NUMBER OF LAKES WITH [illegible] VALUES)

LAKE CODE	LAKE NAME	[illegible] TOTAL P	[illegible] [illegible] P	[illegible] [illegible] SEC	[illegible] CHLORA	[illegible] [illegible] TO	[illegible] [illegible] [illegible] P
2001	[illegible] LAKE	47 (74)	65 (34)	67 (23)	59 (24)	63 (25)	94 (1)
2002	[illegible] LAKE	41 (11)	11 (2)	63 (25)	65 (11)	2 (0)	56 (4)
2003	LAKE [illegible]	57 (9)	48 (9)	61 (11)	72 (13)	42 (7)	23 (4)
2004	[illegible] [illegible]	72 (13)	72 (13)	78 (14)	56 (10)	50 (9)	65 (14)
2005	[illegible] LAKE	11 (2)	33 (6)	33 (6)	44 (8)	78 (14)	0 (0)
2007	[illegible] LAKE	28 (5)	0 (0)	11 (2)	11 (2)	100 (18)	17 (3)
2008	[illegible] LAKE	83 (15)	50 (9)	94 (17)	83 (15)	33 (6)	82 (22)
2009	[illegible] LAKE	44 (8)	83 (14)	39 (7)	42 (8)	34 (2)	83 (15)
2010	[illegible] LAKE	94 (23)	83 (14)	28 (5)	0 (0)	72 (13)	65 (12)
2011	[illegible] LAKE	78 (14)	58 (9)	56 (10)	94 (17)	42 (7)	56 (10)
2012	[illegible] [illegible] LAKE	33 (6)	39 (7)	83 (15)	28 (5)	0 (0)	28 (5)
2013	[illegible] [illegible]	92 (16)	28 (5)	50 (9)	39 (7)	34 (2)	83 (15)
2014	[illegible] LAKE	17 (3)	0 (0)	0 (0)	67 (12)	94 (17)	22 (4)
2015	[illegible] [illegible] LAKE	0 (0)	17 (3)	22 (4)	33 (6)	22 (4)	11 (2)
2016	LAKE [illegible]	0 (0)	56 (9)	0 (0)	0 (0)	56 (10)	0 (0)
2017	LAKE [illegible]	100 (18)	44 (8)	100 (18)	100 (18)	28 (5)	100 (18)
2019	[illegible] LAKE	39 (7)	22 (4)	72 (13)	78 (14)	67 (12)	39 (7)
2021	[illegible]	22 (4)	100 (18)	17 (3)	17 (3)	61 (11)	44 (8)
4007	[illegible] LAKE	67 (12)	94 (17)	44 (8)	50 (9)	89 (16)	89 (16)